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Environment Ontario

Legacy

Winter 1984-85

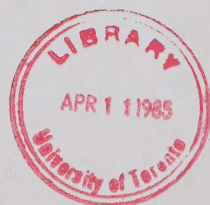
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Morley Kells appointed Minister of the Environment

Ontario's new Minister of the Environment is the Honourable Morley Kells, MPP for Humber, whose appointment was announced by Premier Frank Miller in February.

The Honourable Morley Kells, MPP for Humber, was elected to the Ontario Legislature in 1981, and in September of 1983 was appointed Parliamentary Assistant to the Minister of Transportation and Communications.

He has participated in three levels of politics, as organizer, worker and candidate, and served from 1972 to 1974 as an Executive Assistant to the Honourable James Auld, Minister at the formation of the Ministry of Environment.

In 1971 he began his quest for political office as the provincial candidate in Lakeshore and was unsuccessful. He turned to municipal politics and was elected Ward One Alderman in Etobicoke in 1976 and won election to Board of Control and Metropolitan Toronto Council in the 1978 municipal election. In 1980, he was an unsuccessful candidate for Mayor of the City of Etobicoke. After a short period as Senior Vice President of Controlled Media Communications, publisher of the Blue Jays' program, he returned to politics as the PC candidate for the Riding of Humber.

The Minister was born in Midland, Ontario, and at an early age he moved with his family to the York Township section of Metro Toronto. Subsequently, the family moved to the Lakeshore part of Etobicoke where he finished his education.

He began his business career in the Public Relations Department of the Ontario Society for Crippled Children. In the early 60's, he joined the Toronto Telegram as a news editor and progressed to the position of Assistant Promotion Manager.

From there, he joined the Public Relations Department of MacLaren Advertising as an Accountant Executive for a number of major accounts.

As a result of his work on the Imperial Oil account, he became Creative Director (1964-1970) of the Hockey Night in Canada telecasts and Editor of the Maple Leaf Hockey Program and Magazine.

An avid sports enthusiast, Mr. Kells was one of the founders of the National Lacrosse League and is a member of the Canadian Lacrosse Hall of Fame.



He has an extensive background in sports promotion, and prior to becoming a full-time politician he operated his own company specializing in promotional programs for national companies.

Mr. Kells and his wife Gloria have four children, sons Bradley and Terry and daughters Christine and Louise.



Ministry
of the
Environment
Ontario

Hon. Morley Kells
Minister

Allen E. Dyer, MD
Deputy Minister

Environment Ontario **legacy**

Winter 1984-85

Vol. 13, No. 1

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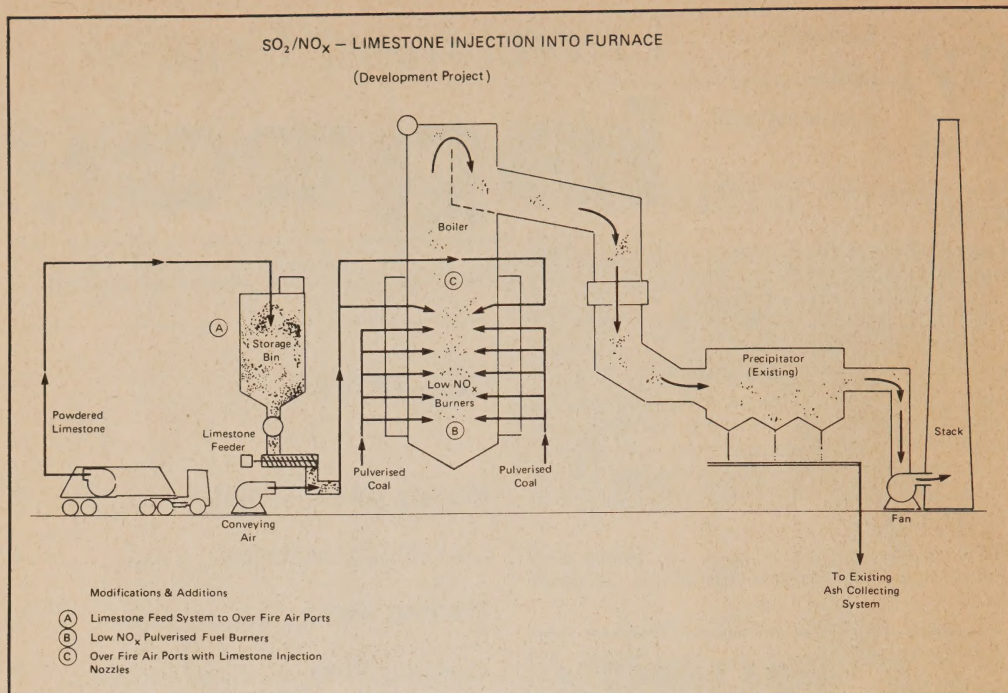
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Source separation and recycling of waste can take many shapes — some of them are described in our reports starting on pages 14 and 18.



Hydro studies limestone scrubber

Ontario Hydro will install a prototype dry limestone injection scrubbing system on a 300-megawatt generating unit along with state-of-art low nitrogen oxide burners. The aim of the project is to develop a pollution control system that can economically reduce acid rain causing emissions from coal-fired plants.

Hydro expects to add such systems to larger, 500-megawatt units at other coal-fired stations if the prototype proves to be feasible.

In the new system, the scrubbing device will inject dry limestone into the furnace. The resulting dry waste will be collected by precipitators or filters.

The limestone injection scrubbers could reduce the units' sulphur dioxide emissions by 20 to 30 per cent and the nitrogen oxides emissions by 20 to 30 per cent. Work on the project

began in November and testing of the \$2.4 million device is expected to start in the fall of 1985.

Hydro's sulphur dioxide and nitrogen oxides emissions have been under a government regulation since early

1981. The object of the regulation is to reduce these emissions by 43 per cent by 1990. Hydro says the new technology could reduce emissions from its coal-fired stations by 40 per cent by 1988 and by 50 per cent by 1990.

New way to recover energy

A new method of producing energy from municipal garbage will be tested at Ontario's Experimental Plant for Resource Recovery in Downsview.

The technology, under development by Enercan Energy Services, a subsidiary of Enercan Inc. of Willowdale, involves burning processed solid waste in a two-stage rotary-kiln in-

cinerator. Enercan owns and will operate the incinerator during the tests.

The Enercan project is consistent with the objectives of the experimental plant, which include the development and evaluation of waste processing technology.

The testing began in February and will continue for three months.

'Treated Ontario water second to none'

In November, Environment Ontario released the most comprehensive study of Ontario drinking water ever done. The study was done as a companion project to the Niagara River Toxics Committee report.

In this study, Environment Ontario sampled treated water at four water treatment plants in the Niagara area — at Niagara Falls, Fort Erie, Welland and St. Catharines, and at the three plants in Hamilton, Oshawa and the R.L. Clark plant in Toronto.

"Of the 139 chemicals of concern cited in the NRTC report as being in untreated Niagara River water, we could detect only very minute traces of nine organic compounds in treated water," Environment Minister Andy Brandt said. "Not a single one exceeded our water quality objectives or existing water quality criteria."

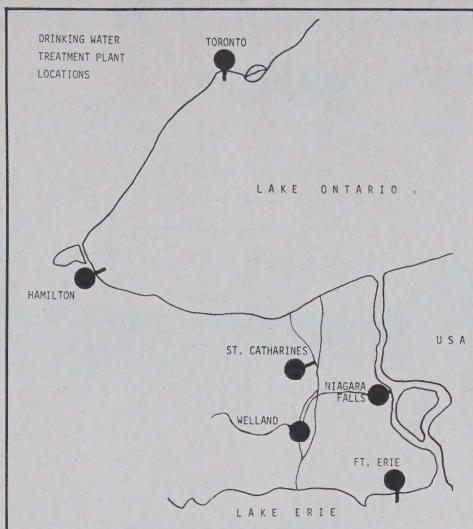
Three of the nine are created during treatment of raw water. The other six were detected only in the parts per trillion range, at levels at least hundreds of times below the threshold levels at which toxicity is believed to occur.

For example, Mr. Brandt said that a person would have to drink more than 30,000 glasses of water a day every day for a lifetime to exceed the safety levels of the chlorinated benzenes detected.

The treated water was also sampled for metals found to be present in raw Niagara River water. The sampling found none of the metals defined as toxic — arsenic, cadmium, mercury or lead — in drinking water even at levels less than the part per billion level.

The six metals that were detected, including aluminum, copper and zinc, were those found naturally in Ontario's surface waters, Mr. Brandt said.

"The analysis of the drinking water indicates that it more than meets all health-related objectives known to medical and scientific authorities," he said. "The water that comes from Ontario's water treatment plants is second to none in the world."



Ten U.S. plants threaten Niagara water quality

Based on information gathered in 1981-82, 89 per cent of priority pollutants found in the Niagara River comes from the United States and 11 per cent from the Canadian side of the border, states a report on Niagara River pollution issued by the Niagara River Toxics Committee in December.

The report singles out 10 facilities as being responsible for 90 per cent of the pollutants traced to specific industrial and municipal point sources. Nine out of 10 are on the U.S. side. The one on the Canadian side is Atlas Steels Company of Welland.

The NRTC report also cited 61 waste sites on the U.S. side and five in Ontario to have significant potential effect on the Niagara River.

The five Canadian sites are:

- Cyanamid Company of Canada's waste storage site at Niagara Falls;
- Cyanamid's waste site at its Welland fertilizer factory;
- Atlas Steels' waste site in Welland;
- Fort Erie's municipal waste site;

- Canadian National Railway's waste site in Niagara Falls.

In announcing the NRTC report, Environment Minister Andy Brandt said that Ontario has taken action on the one industry and the five landfill sites cited. Atlas Steels Company "was put under control orders by my ministry and with the installation of pollution abatement equipment costing \$10 million has reduced its discharges of heavy metal by 85 per cent," Mr. Brandt said.

"In the case of the landfill sites of the Atlas Steels Company and Cyanamid remedial actions have been taken under control order and by agreement after successful prosecution."

"In the others, my ministry has undertaken investigations, including borehole sampling. So far there is no evidence of a problem," Mr. Brandt said. He also noted, that the CN railway site is under federal jurisdiction. Although it has been closed, the province is asking the federal government to take action.

Acid rain

Quetico Park not in danger



"Sulphate depositions in the Quetico area are well below the levels our scientists consider tolerable," Environment Minister Andy Brandt told the Quetico Foundation annual meeting in November. "No lakes or rivers are endangered by acid rain anywhere in the park or the immediate surrounding area."

Environment Ontario, Ontario Hydro and the Ministry of Natural Resources monitor acidic precipitation in the Quetico region and all have found the annual deposition of sulphates to be less than 10 kilograms per hectare per year, or about nine pounds per acre.

The limit for wet deposition the ministry wants to reach to ensure protection of all but the most sensitive areas is 20 kg/ha, or double the present deposition in Quetico.

Some parts of Muskoka now average 30 kg/ha and parts of the Adirondacks in the U.S. receive 40 kg/ha.

The Quetico region is being monitored to establish a baseline for sulphate depositions in a minimally affected area.

Mr. Brandt said concerns about the operation of the Ontario Hydro Atikokan generating station are unfounded. The Atikokan station will be small, only 200 megawatts

or one-quarter the originally suggested size, will only operate during peak demand and will burn low-sulphur coal.

After studying the impact of the plant, Environment Ontario, Environment Canada and the U.S. Environmental Protection Agency agreed that even in worst-case scenarios the project would present no serious environmental risk.

The actual sulphur dioxide emissions from Atikokan are expected to be in the range of 1,600 to 2,500 metric tonnes per year — or about as much as the Inco smelter at Sudbury produces in a day.

SIU gets new teeth

The Special Investigations Unit (SIU), Environment Ontario's investigative branch, has been strengthened by the appointment of Alexander Douglas as chief investigator. Mark McKenney becomes assistant chief investigator.

In addition, a six-member forensic sciences team headed by scientist Ivy Wile has been established at the ministry's central laboratory in Etobicoke to provide immediate backup to field investigators.

Joining the unit also is an expert in photographic aerial reconnaissance, Ron Johnson.

The SIU was formed in 1980 as a special unit of the ministry to investigate violations of Ontario's environmental laws, to collect evidence and to testify before courts. Members were selected from ministry staff and trained at the Ontario Police College at Aylmer.

the right to enter and examine

All SIU members are designated as Provincial Offences Officers. Along with other specialists in the ministry's regional and district offices, they concentrate on such illegal practices as the unauthorized hauling or dumping of hazardous waste.

Officers have the right to enter any premises where they suspect a violation of environmental laws, to examine books, documents and records and to remove samples.

Mr. Douglas served for 32 years on the metropolitan and former City of Toronto police forces. His experience encompasses the handling of a wide variety of cases, from petty theft to murder.

Mr. McKenney is an original member of the SIU who served for the past year as executive assistant to the deputy environment minister, Dr. Allan E. Dyer.

Ron Johnson gained his experience in photographic reconnaissance with the U.S. Federal Bureau of Investigation and the U.S. Naval Air Force. In 1978 he organized Operation

Skywatch, a pollution monitoring program for the Environment Ministry in co-operation with the Ninety-Nines Incorporated, an international organization of women pilots.

New grants to municipalities...

Major changes are being made in the Ministry of the Environment's grant program for water and sewage works, Ontario Environment Minister Andy Brandt announced in November.

"We will be committing \$34 million to assist municipalities in providing essential environmental services to small communities and rural areas," he said.

"These changes will provide increases in grant funding for small municipalities, simplify the grant calculation, and extend financial help to certain municipalities which were not eligible for grants in the past," Mr. Brandt said. This is a major step forward in terms of providing services essential to the public health and welfare of smaller communities across Ontario."

In order to solve the problem of the high cost of providing water and sew-

age services in small municipalities, ministry grants will now be fixed at a maximum 85 per cent as compared with the former 75 per cent in communities with populations of less than 1,000. For communities with a population greater than 7,500, the grant would remain at 15 per cent for major works. Grants for municipalities in between will be scaled from 85 per cent to 15 per cent on the basis of population.

In addition, the ministry will make additional grants available to assist in the construction of water and sewage works in certain small communities within regional municipalities. Where grant levels were formerly limited to 15 per cent for major facilities, grants of up to 60 per cent now will be provided for local water and sewage services conditional on the regional municipality's contributing 25 per cent of the project cost.

...and to farmers

A new program of 25 per cent provincial grants will help solve rural water quality problems, Environment Minister Andy Brandt announced in November at a meeting in Essex County.

"While most towns and villages are able to serve their immediate communities with water, the distribution systems do not always extend down the concession roads to nearby farms and homes," Mr. Brandt said. "My ministry is prepared to provide up-front assistance of 25 per cent of capital costs to extend water lines to rural homes where private wells are not adequately supplying needs."

In Lambton, Kent and Essex Coun-

ties, for example, farm residents often have difficulty obtaining enough good quality drinking water because of local groundwater problems. Many people have had to truck in water to their homes.

The new funding will be applied to the installation of water pipes from existing serviced communities to rural homes. This assistance, coupled with the use of low-cost plastic pipe, is designed to make these services affordable to rural residents.

The intention is to meet a basic need for drinking water, not to provide a high-volume supply. For example, these services will not provide water for fire protection and farm irrigation.

Two ways to establish objectives

To ensure the continuing high quality of drinking water in Ontario, Environment Ontario has developed the Ontario Drinking Water Objectives. The primary purpose of the objectives is the protection of public health. The objectives set out limits for acceptable levels of various substances that may be found in drinking water. The presence of such substances is considered to be acceptable if the amount is so low that it does not pose a significant risk in a lifetime of consumption.

To determine such acceptable levels two approaches are generally used. The Acceptable Daily Intake (ADI) approach applies safety factors to levels of substances that have shown no observable effect in animal studies. The other approach is more mathematical. It is based on the extrapolation of experimentally determined effects of varying doses on animals to lower dose levels at which no effect can be expected.

The ADI (Safety Factor) approach

The ADI of a substance is defined as the dose that is expected to have no lifetime risk when taken daily. It is based on the amount of a substance that shows no adverse effect in animal studies; this is known as the lowest non-observed adverse effect level (NOAEL).

Safety factors are then applied to the NOAEL. They may range from 10 to 1,000 depending on considerations such as:

- quality of the data
- extrapolation of animal data to man
- different sensitivities within human populations
- strain and species of animal used
- variations in exposure patterns
- consumption by sick and healthy individuals

The NOAEL of a substance divided by a chosen safety factor yields the ADI for humans for that substance. For example: the ADI for humans determined by animal experiments and

TABLE 1
Maximum Acceptable Concentrations
Parameters Related to Health

Parameter*	Concentration (mg/L)
Arsenic	0.05
Barium	1.0
Boron	5.0
Cadmium	0.005
Chromium	0.05
Cyanide (Free)	0.2
Fluoride	2.4
Lead	0.05
Mercury	0.001
Nitrate (as N)**	10.0
Nitrite (as N)	1.0
Nitritotriacetic Acid (NTA)	0.05
Pesticides	
(Aldrin + Dieldrin	0.0007
(Carbaryl	0.07
(Chlordane	0.007
(DDT	0.03
(Diazinon	0.014
(Endrin	0.0002
*** (Heptachlor + Heptachlor Epoxide	0.003
(Lindane	0.004
(Methoxychlor	0.1
(Methyl Parathion	0.007
(Parathion	0.035
(Toxaphene	0.005
2,4-D	0.1
2,4,5-TP	0.01
Selenium	0.01
Silver	0.05
Trihalomethanes****	0.35
Turbidity	1 FTU
* Unless otherwise stated the limits for each substance refer to the sum of all forms present.	
** Where both nitrate and nitrite are present, the total nitrate plus nitrite-nitrogen should not exceed 10 mg/L.	
*** When more than one of these pesticides is present, the "total pesticides" shall not exceed the sum of their MAC's or 0.1 mg/L whichever is the lesser.	
**** The term "trihalomethanes" comprises chloroform, bromodichloromethane, chlorodibromomethane, and bromoform, and their concentration as determined by the gas sparge or purge equivalent method (i.e. actual concentration) should not exceed 0.35 mg/L at any time.	

with the safety factor included may be 1 milligram per kilogram of body weight per day, or, as the average weight of a human consumer is about 70 kg, 70 mg per day.

But man does not live by water alone. Varying amounts of the same substance may also reach the human body through the consumption of solid foods or by other means. According to the situation, only between one and 20 per cent of the total daily intake may be used to set the guideline for water. If the amount of ADI assigned to water is one per cent, the level would be set at 0.7 mg. If the amount is 20 per cent, the level would be set at 14 mg.

A further adjustment is necessary as the daily intake of water of humans is about two litres. The Maximum Acceptable Concentration would therefore be set at 0.35 mg/L if it is assumed that water contributes only one per cent of the ADI, or at 7 mg/L if it is assumed that water contributes 20 per cent to the ADI.

The Extrapolation (Risk Estimate) Approach

For this approach to the establishment of an objective, a "dose-response" curve is required. The curve charts the specific response of animals against a range of doses of the substance under investigation. The curve is then extended into the no-effect range by the application of mathematical models. The no-effect range will then allow the determination of a level of the substance associated with a calculated, very low level of risk.

All these models assume that there is a calculated risk regardless of the size of the dose. At low levels, a wide variation in calculated numbers can occur, even when starting with the same original data. This can lead to different acceptable levels being developed for the same substance by different regulatory agencies.

For carcinogens, for example, the model chosen will calculate a risk estimate in terms of excess cancers per exposed population for the ingestion of the substance in milligram per

TABLE 1A Interim Maximum Acceptable Concentrations Parameters Related to Health	
Parameter	Concentration (mg/L)
Polychlorinated Biphenyls	0.003
Uranium	0.02

TABLE 2 Maximum Desirable Concentrations Parameters Related to Aesthetic Quality	
Parameter	Concentration*
Chloride	250
Colour	5 (TCU) **
Copper	1.0
Iron	0.3
Manganese	0.05
Methane	3 L/m ³
Odour	Inoffensive
Organic Nitrogen***	0.15
Phenols	0.002
Sulphate	500
Sulphide	Inoffensive
Taste	Inoffensive
Temperature	15°C
Total Dissolved Solids	500
Total Organic Carbon	5.0
Zinc	5.0
* Unless otherwise indicated, the maximum desirable concentrations are expressed in mg/L	
** True Colour Units.	
*** Total kjeldahl nitrogen minus ammonia nitrogen.	

kilogram. The calculation of the acceptable level of that substance for drinking water then follows a similar

procedure as that for the ADI to give a Maximum Acceptable Concentration (MAC).

Microwaves for analysis

A research grant of \$9,400 for the development of a new sample preparation method has been awarded to Ryerson Polytechnical Institute.

In this study, microwave technology will be applied to the analysis of complex solid samples. The method

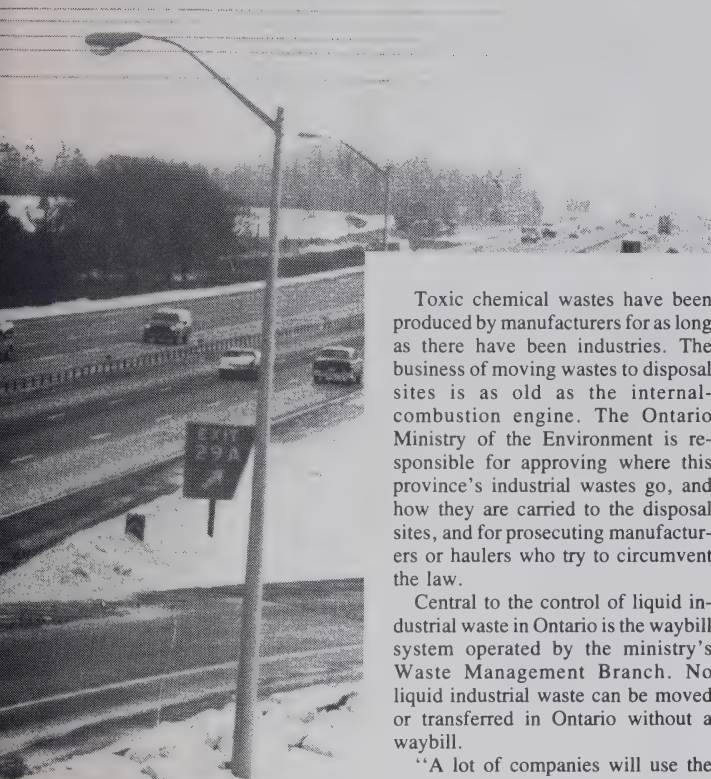
will make analysis for elements such as lead and cadmium easier and improve the automation of present analytical systems at reduced cost.

The research will be carried out by Dr. J. MacKey of Ryerson Polytechnical Institute in close co-operation with ministry specialists.

Liquid industrial waste — waybil



system controls every move



Toxic chemical wastes have been produced by manufacturers for as long as there have been industries. The business of moving wastes to disposal sites is as old as the internal-combustion engine. The Ontario Ministry of the Environment is responsible for approving where this province's industrial wastes go, and how they are carried to the disposal sites, and for prosecuting manufacturers or haulers who try to circumvent the law.

Central to the control of liquid industrial waste in Ontario is the waybill system operated by the ministry's Waste Management Branch. No liquid industrial waste can be moved or transferred in Ontario without a waybill.

"A lot of companies will use the forms even when they don't have to," says Hardy Wong. "They use them just to protect themselves." Mr. Wong is manager of Environment Ontario's industrial waste management policy section. "It is illegal not to use the form for liquid industrial waste."

There are three different groups of people involved in the disposal of liquid industrial wastes: the generators, who produce the wastes, the receivers, who accept the wastes at treatment or disposal sites, and the waste carrier, who is contracted by the source companies to move the wastes from one place to the next.

Alex Thomas, president of Thomas

Waste, is a carrier. He is prominent as a spokesman for the industry, and feels the service has received an unmerited black eye from its critics.

"We lose, at the very most, less than one per cent of our business to illegal haulers. We're dealing with a shrinking market. If anyone is taking my business away by getting around the law, then of course I want him stopped."

He says there are very few "midnight haulers" on the roads, and bristles at the thought of there being any at all. As a member of the Ontario Liquid Waste Carriers' Association, he submitted a brief to a recent sym-

tough penalties recommended

posium on environmental law which recommended tougher penalties against haulers who violate environmental protection laws. He wishes the public would understand just how regulated the liquid industrial waste business is.

Thomas runs a fleet of five tanker trucks out of a base in Mississauga. The trucks can hold anywhere from 2,400 to 4,000 gallons of liquid. Most of his business is in the industrial belt around the Canadian side of the Great Lakes.

At nine o'clock on a cold, raw winter morning, Bob Goodfellow and Charley Stewart look a bit frazzled.

The day started early for them, in Bob's case, at one in the morning. Stewart has just returned from making a pickup. Goodfellow talks about his company with the air of someone who knows his job well, and likes it. He'd been a driver for a number of years before becoming a dispatcher at Thomas'. He is asked about truck safety.

never a spill

"We've never had a tanker spill," he says. "I've been here for a year and a half."

Mr. Thomas had mentioned a safety training program for his drivers.

"Some of us, a lot of us, have been down to Texas A & M for training courses," he says. "And we've sent a lot of our people to another training course at Lambton College." He points at a row of diplomas along his office wall. "We see every waste we touch as dangerous. A gallon of water is dangerous if you're lying face-down in it. So it's a matter of how you handle a product, more than anything else. We don't just send our drivers out in a truck. They get six months' training from us, and they spend a lot of that time teamed with a driver foreman, going on low-hazard runs, learning the procedures, before we think they're ready."

On each run the driver brings a waybill. There are three boxes on it to be completed. Box "A" specifies the name and address of the source-company. The company fills it out, and specifies the type of waste being hauled. Some of the chemicals listed on the bill sound common (acids, paints, solvents), some sound almost whimsical (oily water, cosmetics), and some sound more sinister (cyanides, PCBs).

Thomas Wastes has chemists on staff who check the wastes to ascertain what is in them. When a company hires Thomas as a waste-carrier, those chemists analyze a sample of the waste. When one of their drivers goes to a pickup run, he will make sure that the product matches what the chemists

say it should. If it does not, he refuses the load. When the load is brought to the yard, a "fingerprint" test is performed on yet another sample. Such properties as pH, specific gravity, and conductivity are made on it, and if the sample's fingerprint doesn't match what the hauler has been told to expect, the source company is required to explain why.

The point, of course, is to be sure the company is sending out what Thomas is told they could expect. Goodfellow says the driver's own eyes are often as accurate a judge. "Most of our business is repeat. The drivers are used to seeing the same waste and if there is any change they can always tell."

Each truck contains a fire extinguisher, hoe, shovel, rake, and respirator. For the handling of some wastes, a respirator is mandatory gear. For others, it is optional. Most company drivers use them more often than required. At the company headquarters in Mississauga are full rubber suits, acid-resistant suits, and self-contained breathing units, all for use in emergencies.

wastes vacuum sealed

Out in the yard, the morning sky is so cloudy the street-lamps are still burning. There are two vacuum trucks parked in the yard, one with 20,000 gallon capacity, the other with 40,000. They look surprisingly compact. They are painted chocolate brown. Wastes are vacuum sealed when in transit. It is partly a safety measure and partly a way to facilitate loading and unloading. The trucks are gleaming, even on a cloudy day. That is partly a matter of general upkeep; it is also because the company does not want a salt-stained or mud-clotted truck on the road. A person in a car might take those marks for chemical leaks, which they are not.

Alex Thomas is very aware of the public perception attached to the waste-hauling industry, and he is doing what he can to change the sector's image. He has a story to tell about it. A film company was making a documentary about toxic wastes,

and approached him for co-operation. He still looks incredulous when he says what happened next.

"So we set up a film shoot for them. We let them film at our company. We found a source company that was willing to let them film inside their plant, you know, to film us making a pickup there. And we arranged for them to come along.

no midnight hauler

"And a few months later, we saw the film." He shakes his head slowly. "And the first scene was of our truck pulling out of that factory, with our company logo on the driver's door. And the first line the narrator spoke was, 'And now, at dawn, the midnight haulers begin to roll...'"

It was long enough ago that he can almost joke about it.

Did he sue?

"No. We got a great big apology. But can you see what we go through in this business?"

Section "B" of the waybill is filled in by the receiver. It tells where the load has been sent. Section "C" is filled out by the carrier, and certifies that he did in fact carry it.

When the load is picked up at the source, the source company keeps two copies and sends one to the Environment Ministry. The carrier keeps one copy. When the load is accepted at the disposal site, the receiver takes two copies and sends one to the same ministry. The end result is that everyone who touched the cargo has a record of it, with the Environment Ministry holding two more copies. The ministry feeds it into a computer and matches the data for each copy it receives. That is how it keeps track.

The person responsible for tracking down waste management abuses in the ministry's central region is Jim Gallagher. Talking with him and the four investigators on his team is like talking with a roomful of cops, which

in fact they almost are. They are all trained chemists or engineers and they have all taken a six-week investigations course at the Ontario Police College at Aylmer. The first team leader of their unit had come from the Ontario Provincial Police on loan.

Illegal dumper fined \$3 million

waybills must match

"The point of our job," Mr. Gallagher says, "is that if a person is prepared to dump, we are going to take them to court."

His team investigates at all three steps of toxic-waste handling — at the source, the hauler, and the receiver. Their most basic responsibility is to make sure the waybill copies their ministry receives match up, and to investigate any discrepancies. The rest of their job involves a great deal of — well, looking around.

They will get tip-offs that a company is planning to dump waste chemical. Often the tips will come from certified haulers, who loathe the unlicensed haulers. In cases like that, an illegal discharge can be stopped before it would have transpired.

"We'll let them know that we know," one of the team says. "Drop in at the factory and go on a tour and talk about other things, and they'll make themselves sound so clean... and at the end we'll just casually mention, 'And about those twenty drums of ____?' You should see their faces sometimes." The others at the table smiled. It seems to be a perquisite of the job, to collect stories like that.

some loopholes

There are loopholes in the present laws and some companies, receivers, or haulers will find ways to slip through them. An unlicensed hauler will approach a company and say he has a method for recycling their waste products (recyclable materials are presently exempt from the waybill regulations). The company will pay that hauler to move it for them. The hauler then will dump the batch illeg-

A mismatch in liquid industrial waste waybills and residents' complaints about strange goings-on led to a record \$3 million in fines imposed in February on Eagle Disposal Systems Ltd. of Weston.

The company was convicted by Provincial Court Judge Vibert Lampkin on charges of illegally hauling, storing and dumping hazardous wastes on a farm near King City, about 50 km north of Toronto.

In addition, company president Claudio Saraccini was convicted on charges of breaching the Ontario Environmental Protection Act and the Ontario Water Resources Act and ordered to pay a \$50,000 fine.

Mr. Saraccini also faces a \$600,000 lawsuit launched by the Provincial Government in order to recover part of

ally. Or a company will use a waybill but, when it comes to stating the name of the waste product, check off the wrong box. Or a company will set up its own, geographically isolated, dumpsite, and bypass the legislation by hauling its own wastes there (all dump sites must have a certificate of approval issued by the Environment Ministry.)

"Some operators are sharp," one of the investigators says. "They can hand you a lump of coal and convince you it's a diamond. One guy convinced a company he could turn paint sludge into candles and fireplace logs."

Certified haulers such as Thomas Waste are rarely a concern for the Special Investigations Unit. The problems are far more likely to be with unlicensed haulers who look for ways to circumvent the waybill legislation. In Ontario, a receiver needs a licence from the ministry to receive liquid industrial waste, and a hauler needs a special licence to haul it. A person

the cost of cleaning up the site.

Although the dumping caused severe contamination, Environment Ontario succeeded in cleaning up the site completely. The cost of the ten-week clean-up was estimated at \$728,000. The owners of the site, Leonardo Castoro and Nicola Cosentino, were fined \$1,000 and contributed \$80,000 toward the clean-up costs. Another \$150,000 was contributed by the Allen Group whose companies produced much of the waste.

The fines were the result of Eagle's activities in 1982 and 1983. Discrepancies in the waybill record discovered in 1983 led to a close inspection of the site in which ministry investigators used metal detectors and found more than 200 drums of vinyl solvents, latex rubber, hydraulic oil and acid chrome plating.

who operates either a truck or a site without a permit is liable for fines and in some cases jail.

act to be toughened

Hardy Wong agrees that the exemption for recyclable material is a loophole. He adds that by next spring the regulations of the Environmental Protection Act will be tightened so that the source company will be required to specify on the waybill the name of the receiver, and register with the ministry as a generator of liquid industrial waste.

Waste management laws in Ontario are as close to being airtight as human frailty will allow, and are getting even tighter. The Ministry of the Environment, and waste carriers, receivers and producers, have all shown they have a vested interest in tightening the regulations further, whenever they can see a way how.



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Newspaper

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Fine

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Recycling of switches to

Recycling by the separation of waste materials at the source is gaining momentum and many of the operators are seeing a silver lining on the cloud that made life hard for them only a short time ago. That is the im-



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recovery programs
at 914-624 weekdays.

Tins

- clean
- labels removed
- ends cut out & flattened
- pop caps cut off
- pure metal jar lids
- no rubbery components



Ice and snow must be removed from the bins used to collect separated waste at high rise apartments.

domestic waste high gear

pression gained on visits to a number of resource separation operations in Ontario. Private and municipal recycling organizations are recuperating, enlarging their scope and spreading out to involve larger areas.

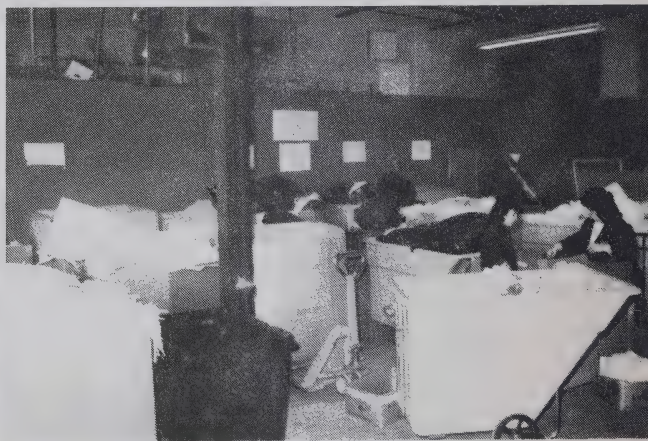
Some of this optimism is based on improvements on the recycled materials market, some of the development of new ways to increase the efficiency of the operation and on improvements in the collection and handling of the

materials.

Environment Ontario has also contributed to an overall improvement by its financial support program that provided \$1.5 million to nine operators since 1981. But perhaps the most important



they are sorted by color.



High grade paper is sorted in the very clean shed of Halton Recycling.

factor is the growing interest and participation of people, of households willing to separate their waste at the source for easier collection and processing.

Another factor is the increasing involvement and co-operation of municipal administrators to do their part in making recycling operations effective.

The most successful of Ontario's recycling operations — and, incidentally, the largest operation of its type in North America — is Total Recycling Systems in Kitchener, Ontario. The brainchild of Nyle Ludolph, Total Recycling has been growing steadily since its modest start in 1976 and operates as a subsidiary of Canadian-owned Laidlaw Waste Systems.

The operation got its biggest boost when it decided in 1984 to buy 35,000 plastic boxes at a cost of \$200,000 and gave them away to every single family dwelling in Kitchener. The blue plastic boxes are used to hold old newspaper, glass and tins and people in Kitchener have fallen in love with them, claims Mr. Ludolph, the operations manager.

Carrying the well visible label "We recycle", the boxes have become a familiar curb-side sight in the city. About 80 per cent of them are used regularly.

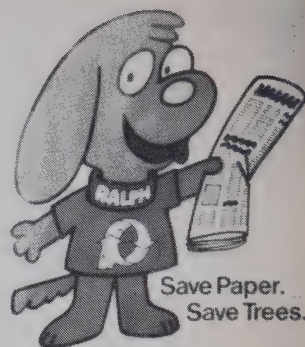
"There are several reasons why the blue boxes have become popular," says Mr. Ludolph. "They are in the home seven days a week, and are well visible on collection day. This reminds family members to recycle and advertises on collection days to the neighborhood, that the household is a 'good sort'. Nobody wants to be the only anti-environmentalist on the block."

special trucks

Total employs 12 people and operates two especially-built trucks with dual controls and separate compartments for the collection of the separated domestic waste. It plans to expand its operation to apartments, townhouses and condominiums.

To keep up the interest and involvement of the population, Total distributes a newsletter, The Total News, as a supplement to the local newspapers. The newsletter promotes a poster and story contest among children, informs its readers of the "Buy Back" centre to which people not involved in the blue box program can bring their recyclables for sale, and suggests composting of organic materials that cannot very well be collected.

Another active and expanding operation is Halton Recycled Resources (HRR), owned and operated by Gwen and George Discepolo as the first regional program of its type. It now covers a population of 250,000 living in Burlington, Oakville, Milton and Halton Hills. Halton Recycled employs 32 people, 17 of whom work



Ontario Paper Recycling Inc.



A funny logo reminds householders and their families to contribute to the newsprint collection of York recycling.

full-time. In a second shift students, working part-time for four hours an evening, earn pocket money.

During the week five trucks collect newsprint, bottles and tins at curb-side. Corrugated cardboard is collected from offices, businesses and private homes. The privately owned operation enjoys a good relationship with the regional administration, which helps in the promotion of the collection and contributes financially by giving Halton Recycling one third of the tipping fee levied for garbage disposal.

to new location

Mrs. Discepolo hopes that she will be able, with the help of the regional administration, to move her clean and orderly operation soon into larger, 10,000 sq. ft. facilities. At the new location she will expand to the collection of other materials as glass and cans.

Richmond Hill Recycling is a non-profit corporation based on volunteers. It provides curbside collection and a depot to which recyclable materials, including used motor oil,



can be brought on weekends.

In addition to newsprint, bottles and cans, Richmond Hill Recycling also collects considerable amounts of fine papers from schools and local industry.

In East York the Community Conservation centre expanded its service in 1984 to collect recyclable materials from apartment houses. Curbside pick-up has been arranged for apartments of up to three stories. High-rise apartments have been provided with centrally located depots.

more fine papers

Together with the curbside collection involving single family homes started in 1978, Community Conservation serves an area of Metro Toronto with a population of about 100,000 people. The collection of fine papers from 85 offices is also being expanded. Fine papers are also collected from several grade school and one high school in the area.

The Conservation Centre operates with two trucks and employs six full-time staff members and two to three volunteers of the federal Katimavik project.

The centre has an active promotion program which includes informative displays in its store-front window, pamphlets distributed together with Hydro and phone bills, presentations in schools and material provided to the local media as well as a variety of posters placed strategically throughout the community.

Another effective, but completely different operation is Niagara Recycling, collecting recyclables in Welland, Thorold, Port Colborne, Pelham and, since January 1985, also in Niagara Falls.

Expansion of the operation to Niagara Falls was made possible by the purchase of two special trucks of the type used by Total Recycling in Kitchener.



Cardboard comes in a wide variety of shapes and is easy to collect and to recycle.



At Total Recycling's yard in Kitchener, plastic boxes for the separate collection of cans, glass and paper can be had for the asking.

Niagara Recycling, managed by Brian McMullan, is a sister operation of the Niagara Training and Employment Centre, an organization devoted to the training of handicapped people. About half of Niagara Recycling's 26 employees are handicapped — and manager McMullan claims that it would be hard to find better and more reliable workers.

Niagara Recycling has another advantage: its facilities are situated not far from the Ontario Paper plant in Thorold, one of Ontario's primary users of recycled newsprint for the production of paper.

In addition to the materials recycled in households, the operation also collects fine papers from some of the large corporations and print shops operating in the area.

At the other end of the Golden Horseshoe, Glenda Gies runs the Durham

Recycling Centre serving Oshawa and Bowmanville since 1976 and, since 1984 also Ajax and Pickering. Durham Recycling employs eight people.

Here, too, the operation receives \$5 from Durham from tipping charges levied for the disposal of waste at the municipal landfill.

Newsprint, glass and cans are collected at curbside and fine papers from local businesses and industry. The collection of used motor oil is left to local garages.

The recycling operations described form only a part of the province's effort to reduce the flow of waste to landfill and to conserve resources. Although details of their operations differ, they are all confident that source separation for recycling has a promising future and that it will continue to grow for the benefit of all.



Experimental resources recovery

Six years of operation answer

One of Environment Ontario's most decisive steps in the management of domestic waste was the start-up of the Experimental Resources Recovery Plant in Downsview in 1978. Since then this plant, still North America's only

facility of its kind, has provided the know-how urgently needed today for further progress in waste management.

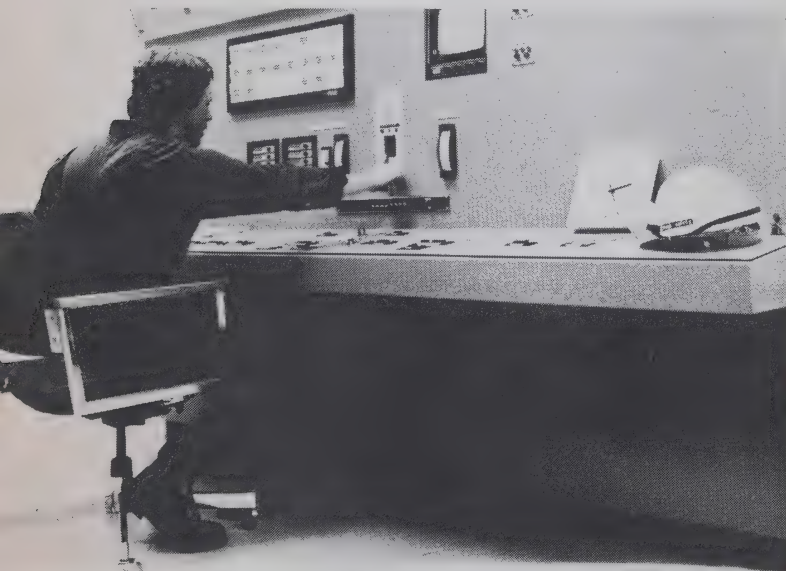
The plant consists of two main components:

- a waste transfer station, and

- the resource recovery plant.

The transfer station is the fourth largest in the Metro Toronto waste management system and is used to transfer the domestic and commercial waste collected by the municipalities and private collection companies to larger Metro trucks for transport to landfill.

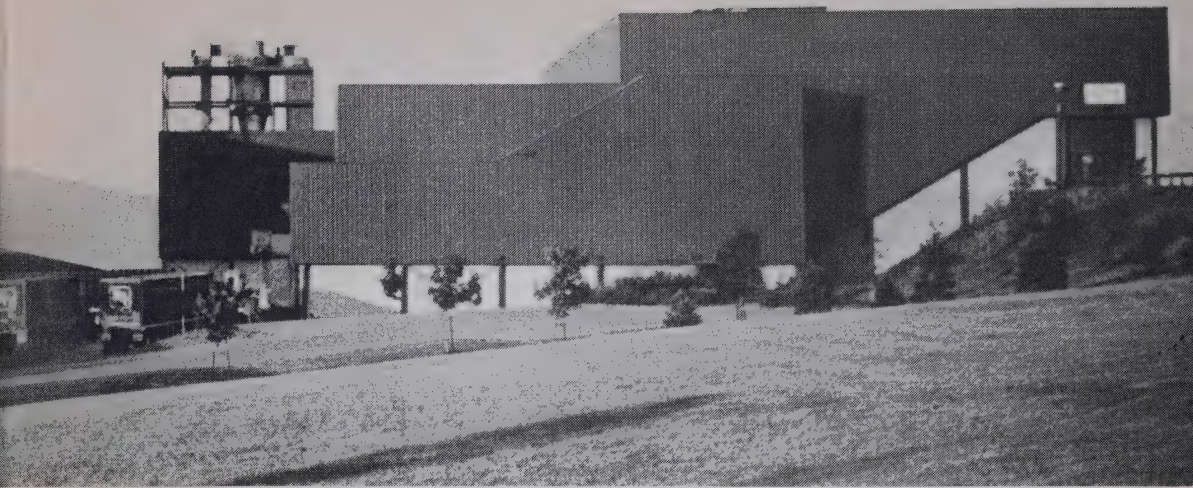
The resources recovery plant processes yearly about 30,000 tons of domestic and commercial waste. This is a small part of Metro Toronto's annual production of 1.8 million tons of garbage — but the resource recovery plant is not designed to dispose of the waste but rather as a research laboratory to serve the ministry's resource management efforts.



The flow of waste through the plant is centrally controlled.

possibilities and limitations

While most of Metro Toronto waste is still going to landfill, the Downsview plant has shown during the past six years the possibilities, the limitations, the conditions under which waste can be mechanically separated into its components, what can be recovered and how mechanical means can best be used for the recov-



many questions

ery of raw materials from municipal solid waste.

Ministry experts have demonstrated the experiences gained to numerous visitors from Canadian municipalities, from the U.S. and from overseas countries. Many of the authorities now operating such facilities in North America have drawn on the ministry's experience for the operation of their plants.

In full operation, the Experimental Resource Recovery section of the plant recovers from solid waste:

- refuse-derived fuel (RDF)
- ferrous metals
- compost
- corrugated cardboard
- a glass-rich fraction

RDF was tried for several years by a large cement company in Southern Ontario as supplementary kiln fuel. The experience gained has shown that RDF can replace upward of 30 per cent of the fossil fuel used. Other cement plants in Southern Ontario are now studying the possibility of using RDF.

Initially ferrous metals recovered at the Downsview plant contained visible contaminants (paper, plastics), which detracted, for esthetic reasons,



Cardboard must be separated manually from the waste stream.

from the marketability of the product. By changes in the production line, recovered ferrous metal now meets the user's standards.

Inconsistencies in quality of the compost produced from organic biodegradable waste were caused by inadequate screening and curing. Addition of proper equipment now results in a compost acceptable to the trade. This compost is now used for the restoration of gravel pits, for land reclamation, in public parks, nurseries, orchards and in commercial gardening.

Corrugated cardboard is relatively easy to recover, to handle and to sell, but, unless it is collected and received in bulk, the quality desired by the trade can only be achieved by manual separation.

Although the glass separated at the experimental plant could be sold with further processing, experience showed that this raw material is best recovered by source separation. Equipment that can separate glass shards from other wastes of similar nature, such as china, plastics, etc., is too expensive.

marketing effort

The operation of the Downsview plant has also contributed significantly to the improvement of equipment used in resource recovery. For example, explosions caused by partially full containers of volatile fluids in the garbage stream led to modifications to the two shredders, a better pre-inspection of the inflow, the installation of sprinklers and other safety measures. No explosions have occurred since 1980.

The efficiency of the fans in the air separator, designed to recover lighter from heavier, non-magnetic materials by high velocity airflow has been improved by a simple change in the setting of the fan blades. A change in fan material has also reduced maintenance.

The Experimental Resource Recovery Plant also includes a large modular incinerator. The experience gained by the operation of this equipment was useful in reviewing propos-

als for similar incinerator installations in Ontario.

In addition to the development of waste separation technology and to the solution of mechanical difficulties, the operation of the plant has also helped to identify and solve problems in the management and personnel field. Operators have been trained and have learned, among many other things, how to cope with variations in waste composition and with emergencies, such as fires and explosions.

Another gap in knowledge concerned the marketing of the recovered materials. Ministry staff has been able to show industry the potential and the value of using materials recovered from waste. It has also learned what is needed to produce materials industry can use.

The intensive management and marketing effort of all parties involved has shown that the mechanical recovery of materials from waste is feasible. Success of the process depends on the ability to produce an assured supply of good quality material and on long term contracts for the purchase of the major recovered materials, such as RDF.

Large tonnage mechanical recovery of materials or energy from waste complements source separation. With full co-operation of municipalities and of industry, recycling and recovery can become an important factor in the overall sound management of domestic and commercial wastes for the protection of our resources and of the environment.



Clean compost is the product of biodegradable materials separated at the Experimental Resources Recovery plant.

Farmers help in atrazine study

About one-third of Canadian crops, valued at \$1.5 billion, are lost annually to nuisance plants, insects, diseases, or other pests. Pesticides serve to curb this crop damage, but experts say there is room for improvement in the use of pesticides.

The Ontario Ministries of the Environment and Agriculture and Food launched a three-year, \$300,000 project earlier this year designed to study the movement of pesticides after they have been applied to fields. The firm of I.E.C. Beak Consultants Limited in Mississauga was hired to conduct the study in the Holiday Creek drainage basin, about 20 kilometres northwest of Woodstock.

The study will also assess the role of erosion and rainfall in the movement of pesticides into surface waters and groundwater.

The project is focusing on the herbicide atrazine, used to control most weeds in corn crop fields, and its uses and transport in relation to the soil types, crop cover, and water quality in

the drainage basin. The herbicide was chosen because it is widely used in Ontario, and it is relatively persistent and soluble in water. The Holiday Creek drainage basin was chosen because background data on atrazine and water quality are available for this area, the drainage basin is small, and the area and soil is representative of agricultural land in Ontario.

More than 50 area farmers are participating in the program by allowing testing on their property and filling out information questionnaires concerning their use of atrazine. Goff Jenkins, environmental scientist and Environment Ontario liaison officer for the project, emphasizes that "the partici-

pation and co-operation of the farmers is vital to the success of the project."

A mobile laboratory will be located in the drainage basin to collect meteorological data, while analysis of the water and soil samples will occur at OMAF labs at the University of Guelph and Environment Ontario labs in Toronto. Groundwater, tile drainage, and surface runoff in the drainage basin will also be tested to study atrazine transport into waterways.

The results of the project will be used to improve pesticide management, to provide data for better application rates and techniques, and to aid farmers in eliminating undesirable side effects of pesticide use.

Air improves in NW Ontario

Significant progress is being achieved in improving air quality in several communities in northwestern Ontario, a recently released Environment Ontario report shows.

The report for 1983 singled out Balmertown, Dryden and Red Rock as towns where air quality had improved the most. Better air was also documented in other locations, such as Fort Frances.

"The 1983 air quality report for northwestern Ontario confirms a continued trend of improvements, which first became evident in the region a few years ago," Environment Minister Andy Brandt said. "This trend demonstrates the effectiveness of past abatement action and, in particular, the benefits from ministry control orders on the pulp and paper industry."

Environment Ontario monitors air quality in Thunder Bay and nine other urban centres in northwestern Ontario. Air measurements are often supplemented by vegetation, soil, and snow sampling programs. These surveys concentrate on the natural resources industries (mining, pulp and paper) which are the major industries in the region.

Copies of the report may be obtained from the ministry's Thunder Bay office.

Lasers to analyze complex samples

A \$27,800 grant for the development of a new solid sample handling attachment for use with laser analysis technology has been awarded to McGill University.

The tool is designed to speed up the handling of solid, complex environmental samples for spectrographic analysis. The technology uses a laser beam to produce fluorescence of heavy metal atoms for increased sensitivity in detecting trace metals.

It would also reduce interference from elements usually present in larger amounts in samples, simplify handling of samples and produce laboratory results at lower cost.

Such research has become necessary with the introduction of inductively coupled plasma in advanced computerized systems used to analyze samples for several elements.

K.A. Howard Pesticides Advisory Chairman

The new chairman of Ontario's Pesticides Advisory Committee is Dr. Kenneth A. Howard of Orangeville.

The committee advises the Environment Minister on issues involving pesticides. It recommends a provincial classification for each registered pesticide product and provides grants for pesticides-related research.

A graduate of the Ontario Veterinary College, Dr. Howard was technical manager of Chem Agro Ltd. of Mississauga, from 1968 to 1983.

From 1948 to 1967, he was vice-president of the A.H. Howard Chemical Co. in Orangeville, which was engaged in developing, producing and marketing fly control products and veterinary medicines.

The chairman's term is for three years.

Controlling industrial pollution

Environment Ontario's initiatives have demonstrated that environmental improvement and industrial progress can be compatible. Significant reductions in waste discharges have occurred over the past 15 years in spite of overall production increases by industry and recurring recessionary factors in the economy. This has been achieved through the construction of treatment facilities, through process changes and through replacement of older industrial production facilities with new "environmentally clean" plants incorporating the latest water recycling, material conservation and energy saving measures.

Following are highlights of achievements made by three major industrial sectors from 1967 to 1981/82, at an estimated pollution control cost of \$500 million. Similar overall progress and expenditures have been made in the other industrial sectors such as petrochemical, metal finishing and fabrication, and food processing.

PETROLEUM REFINERIES

Over the past 15 years, two new refineries have been constructed (start-up in 1977) incorporating state-of-the-art environmental controls, two older refineries have installed secondary (biological), and in some cases tertiary (carbon filtration), wastewater treatment systems.

Together, these activities have resulted in large reductions in the discharges of oxygen-demanding wastes, suspended solids, oil and grease, phenolics and ammonia even though production capacity has risen significantly over the period.

PETROLEUM REFINERIES			
	1967	1981	Change
NO. OF REFINERIES	7	8	+ 1%
PRODUCTION 1000 BBL/DAY	403	633	+ 57%
SUSPENDED SOLIDS KG/DAY	13300 (1972-73)	2170	- 84%
OIL & GREASE KG/DAY	4100	514	- 88%
AMMONIA — N KG/DAY	2320	313	- 87%
PHENOLICS KG/DAY	102	10.2	- 90%

STEEL

There are three primary steel producers in Ontario, two in Hamilton and one in Sault Ste. Marie. Process improvements, better water management practices and

waste treatment facilities have brought about significant reductions in the discharge of suspended solids, oil and grease, ammonia, phenolics and cyanide. The ministry is requiring additional improvements to be made with programs at the Sault mill to be completed by 1990.

STEEL			
	1967	1982	Change
NO. OF MILLS	3	3	
PRODUCTION TONNES/YR	8 Million	10.7 Million	+ 34%
SUSPENDED SOLIDS KG/DAY	126000	35500	- 72%
OIL & GREASE KG/DAY	30000	3380	- 89%
AMMONIA — N KG/DAY	23880	8280	- 65%
PHENOLICS KG/DAY	2730	350	- 87%
CYANIDE KG/DAY	2370	338	- 86%

PULP AND PAPER

Substantial decreases in loadings of oxygen-demanding substances and suspended solids, along with reduced effluent toxicity to finish, have resulted from a combination of mill modernization, better water management practices, process changes and installation of waste treatment facilities. Existing MOE control orders require further improvements to achieve compliance with the Federal Pulp and Paper Effluent Regulations by 1987.

PULP AND PAPER			
	1967	1982	Change
NO. OF MILLS	22	22	
PRODUCTION TONNES/DAY	7350	8540	+ 16%
BOD ⁵ * TONNES/DAY	610	315	- 48%
SUSPENDED SOLIDS TONNES/DAY	375	82	- 78%

*a measure of oxygen-demanding substances



ENVIRONMENTAL IMPROVEMENTS

Achievements in reducing waste loads from these and other industrial sources along with controls on the manufacture and use of a number of chemical compounds in both Ontario and the Great Lakes States have resulted in corresponding improvements in the Great Lakes environment. Notable among the changes observed by the ministry and others are:

- Declining levels of PCBs in sport fish from **Lake Ontario, Lake Erie, Lake Huron, Georgian Bay and Lake Superior.**
- Declining inputs of PCBs, mirex, DDT, chlorinate benzenes and mercury from the **Niagara River** to **Lake Ontario** since the mid 1970s as evidenced by sediment and fish data.
- Significant reductions in levels of phenolics, bacteria and phosphorus in the **Niagara River.**
- Improvements in species diversity and numbers of bottom dwelling organisms which are important to the fish community along the Ontario shoreline of both the **St. Clair** and **Detroit Rivers**, as well as in the western basin of **Lake Erie.**
- Achievement of the water quality objective for phenolic substances and overall reduction in the zone of influence of petroleum refinery and petrochemical plant discharges on the **St. Clair River.**
- Elimination or reduction of esthetic degradation, i.e., oil films, discoloration, and floating solids, adjacent to industrial plants.
- Reductions in mercury concentrations in fish to levels where commercial catches were resumed in the western basin of **Lake Erie** in 1975 and for certain species from **Lake St. Clair** in 1980.
- Declining phenol, cyanide and ammonia levels in the **St. Marys River.**
- Reductions in the zone of influence on water, sediment and biota of pulp mill discharges at all mill locations on **Lake Superior.**

Acid rain

Europe's forests suffer

The forests of West Germany suffer serious damage, and acid rain may be the main culprit, reports Dr. Sam Linzon of Environment Ontario's phytotoxicology section.

"The differences I noticed between the conditions in 1981 and my recent visit in September 1984 are dramatic," he said. "The damage is widespread throughout the country and several tree species are affected. The most sensitive tree is silver fir, but most damage is found in all parts of the country on Norway spruce. European beech is also affected and Scots pines show damage in some areas as well as maple, birch and oak."

in all parts of Germany

Dr. Linzon's invitation to visit West German forests was issued by Prof. Dr. H.J. Jager, Director of the Institut für Produktions- und Ökotoxikologie of the Federal Research Centre for Agriculture in Braunschweig as part of the Ontario-West German agreement on acid rain studies. In 1985, German scientists plan to visit Ontario to work with Environment Ontario experts on studies involving crops treated with simulated acidic rain in Brampton.

During his visit, Dr. Linzon was given a good opportunity to observe first-hand forest damage in all parts of the country and to talk to German scientists and foresters about the possible causes of the damage.

He found that forests were damaged in all kinds of situations — in areas of high pollution and in areas previously considered to be less affected by industrial emissions, in acid and in calcareous soils, on west- and east-facing slopes, in high and low elevations, in old and young forests. Most damage, however, was observed in trees over 60 years of age and at high elevations.

The symptoms Dr. Linzon observed included leaf discolorations,

reduced twig growth, premature shedding of foliage, dieback of the tops of hardwood trees, reduced density of crowns and formation of adventitious shoots.

In many cases these symptoms became apparent for the first time only two to three years ago. Many trees have died as a result of the sudden development of injury, and foresters in many areas were able to meet their annual harvest needs by cutting only recently dead or dying trees.

West German foresters and scientists from all parts of the country had a number of theories to explain the sudden damage. Most stated that air pollution, including acidic depositions, was the overriding factor. Some believed that the pollutants acted directly on the trees by affecting foliage. Others suspected that the pollutants attacked tree roots first.

Some expressed the opinion that two or three decades of exposure to air pollution stressed the forests and made them susceptible to various other agents such as bacteria and viruses. Others named ozone, sulphur dioxide, free aluminum in acid soils and hydrogen ions in calcareous soils as primary agents.

ozone involved

Air pollution by ozone, sulphur dioxide and heavy metals and wet and dry acidic depositions are involved in most of the hypotheses, and the cause of forest damage seems not to lie in a single factor, but is complex, and often site-specific. In some instances, air pollutants may initiate the stress. In others, cations in the soil may be affecting the fine roots.

As secondary factors insects, drought or root fungi may be involved.

"Generally, the West German scientists and foresters seem to agree, but look at the problem from their individual viewpoints as soil scientists, air

quality specialists or botanists," Dr. Linzon said. "In reality, it seems, their hypotheses complement each other."

The differences of viewpoints cause a serious problem for the federal government of Germany. More funds are provided for further research in the hope of finding better answers before large sums of money are invested in pollution abatement.

limited control

Relative to Canada, West Germany is a small country with about three times the Canadian population. During the past 30 years of industrial expansion and intensive production in all sectors of the industry, pollution control was limited.

West Germany's industries and transportation emit about 3.5 million tonnes of sulphur dioxide and 3 million tonnes of nitrogen oxides yearly. There are no mandatory controls of automotive emissions and air quality standards on sulphur dioxide are lenient. There are no air quality standards for ozone or hydrogen fluoride.

"All of the above have contributed to severe pollution problems in central Europe, and the forests have reacted by showing, during the past three years, a decline following decades of industrialization," said Dr. Linzon.

"The same situation could occur in Ontario. Fortunately, we have had good pollution control programs for the past decade. Sulphur dioxide emissions have been reduced and automobiles are required to have pollution control devices.

"Still, we have no reason for complacency. Much of our pollution comes from the United States and unless negotiations between Canada and the U.S. result in effective controls within the next decade, we may find ourselves in the situation similar to the one West Germany is now experiencing."



Trees in various stages of decay can be seen in many forests in central Europe.

It's all one world...

No clean air in Milan or Bagdad

Milan, Madrid, Delhi, Bagdad, Tehran and Rio de Janeiro have something in common. According to a report issued by the World Health Organization (WHO), they are the cities with the unhealthiest air.

Despite the rapid growth of all major cities, there was no deterioration of air quality between 1973 and 1980, but dozens of cities still exceed health targets set by WHO.

One of the surprising findings of WHO is that the quality of air in many

northern cities varies with the season. Helsinki, for example, enjoys clean air in summer, but has some of the smokiest air in the world at other times. The world's largest city, Mexico City, does not keep air quality records and could not be included in the study.

WHO's measure of air quality is based on the levels of sulphur dioxide and of particulates in air — the parameters also used in the determination of the Air Pollution Index

(API) in Ontario.

The most acidic air, with a content of 242 micrograms of sulphur dioxide per cubic metre, was found in Milan. Sao Paolo averaged 135, Santiago de Chile 137, Prague 154 and Tehran 160 micrograms per cubic metre. WHO sets its acceptable limit at 60 micrograms.

Heaviest pollution by particulates was registered in Lahore, Bagdad, Delhi, Calcutta, Tehran, Jakarta, Athens, Madrid, Bogota and Cairo.

Swiss test-burn dioxin

A total of 200 grams of waste containing 2 to 5 grams of dioxin will be burned experimentally in a rotating oven at 1500 degrees celsius in Basle, Switzerland. The owner of the dioxin, the Swiss pharmaceutical firm Hoffman-LaRoche, claims that all dioxin will be destroyed. The oven is in the middle of the city.

The full burn of the 41 barrels of dioxin containing waste from a factory explosion at Seveso, Italy, is scheduled for February 1985 in Basle.

Waste transport

A newly formed council of the U.S. National Solid Waste Management Association will study the problems of hazardous waste transportation. The safe transport of waste is becoming crucial because of the public's opposition to the disposal of such waste in landfills. This results in fewer facilities and longer transport routes, as facilities are few and far between.

The council hopes that some vol-

untary industry-wide standards can be developed for waste transport. Among them would be, for example, a minimum age for drivers, driver training and emergency response plans.

China has environment ministry

The People's Republic of China has established a Ministry for Urban and Rural Construction and Environmental Protection to change the environment for the better, announced China's ambassador in Washington. The Chinese government will concentrate its efforts on the improvement of water quality in the Yangtze and Yellow Rivers, on reforestation and on the control of tree cutting.

Higher stacks

The U.S. Clean Air Act tall stack regulations allow facilities to disperse pollution instead of controlling it, claim U.S. environmentalists.

Clean-up is cheaper

A U.S. chemical company, Mobay Chemicals, accused of improper disposal of wastes, has asked for a stay of proceedings to allow the negotiation of a settlement as legal costs in the Superfund suit may run much higher than the cost of cleaning up. The company claims that costs of legal counsel may range between five and eleven million dollars even before start of the trial, while the cost of the clean-up is estimated at \$6 million.

Bacterial control

Naturally-occurring bacteria may be used to convert certain organic groundwater contaminants to harmless substances, reports the EPA research laboratory at Aba, Oklahoma. This may be applied to remove pollutants such as trichloroethylene (TCE) and similar chemicals from groundwater.

At a General Motors Chevrolet assembly plant in Kentucky, bacteria may be used to destroy solvents, such as acetone and toluene, used in the factory's paint shop.

Cattle, rice disturb ozone layer

Not only fluorocarbons, but also the build-up of methane may disturb the ozone layer in the earth's upper atmosphere, experts of the UN's Consultative Committee on the Ozone Layer (CCOL) believe. The methane build-up, estimated at one to two per cent per year, is believed to be caused by an increase in rice paddies in Asia, in swamp gas emissions from tundras, from termite mounds and by the flatulence of the world's steadily increasing herds of cattle.

The ozone layer, found 25 kilometres up in the atmosphere, absorbs virtually all ultraviolet light from the sun and acts as an important stabilizer of the world's climate.

If all the ozone in the atmosphere could be accumulated on the earth's surface it would only amount to a layer three millimetres thick. Any decrease in this small amount (less than 10 parts per million of the air surrounding earth) would increase the incidence of ultraviolet radiation and cause great disturbances in the earth's weather pattern.

parts of the world and its reduction would be difficult.

But there are other dangers to the ozone layer. The release of chlorine by the eruption of the volcano El Chichon in Mexico in 1983 produced the lowest annual readings of ozone in 60 years at the ozone monitoring station in Switzerland.

Methane is considered to be as effective as CO₂ in producing a greenhouse effect and its level in air increases three times as fast as CO₂ levels. The temperature increase of the greenhouse effect also affects the chemical reactions of ozone. Moreover, the slow oxidation of

methane converts chlorine to hydrochloric acid, which then returns to earth as acid rain.

The CCOL determined at a symposium in Geneva that the ozone layer has been depleted by only 3 per cent since 1970 and may be expected to change by less than one per cent over the next few decades. Unfortunately, most of the decrease happens in the more important upper layer of ozone.

The whole subject is still shrouded in many uncertainties. More research is urgently needed, claim members of the CCOL, as well as more monitoring stations, more data for computer models and more funding.

Bacteria heal groundwater

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At a General Motors Chevrolet assembly plant in Kentucky, bacteria may be used to destroy solvents, such as acetone and toluene, used in the factory's paint shop.

aerosols banned

Changes in the ozone layer are produced by a chemical reaction of ozone with small amounts (parts per billion) of chlorine or other chemicals. To protect this tenuous ozone shield, the use of chlorofluorocarbons as aerosols was banned in 1975 in the U.S. and in Scandinavia. The European Economic Community (EEC) has imposed an upper limit on the production of such fluorocarbons.

Despite the ban, chlorofluorocarbon concentrations in the atmosphere increase by about 7.5 per cent per year. This increase seems to be caused by the continued use of the compound in refrigeration and the prospect of replacing it with less dangerous materials is slim. More importantly, refrigeration has become vitally important to the health of people in many

New approach to pest control

A new approach to the control of pesticide-resistant mosquitoes has been developed by the Wolfson Mosquito Control Project of Southampton, England. In this method, a extremely thin monomolecular film is spread over the surface of water. The film remains on the surface for up to 30 days and drowns mosquito pupae and egg-laying adults. As the film is not effective against larvae, a specific bacillus is added to it. The bacillus attacks the larvae and the film helps to spread the bacillus.

The film is biodegradable and can be applied easily, while the bacillus used is highly selective.

The method has been used successfully in Sri Lanka and may be

used by the South Asia Cooperative Environment Program.

Formaldehyde-eater

Spider plants can remove formaldehyde from air, NASA scientists found. An average home could be kept completely free of formaldehyde by 70 spider plants.

Toxic research center

A U.S. centre for research on hazardous and toxic substances has been established at the New Jersey Institute for Technology in Newark. Funding for the centre is provided by the government, by industry and by the academic community.



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of the
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Allen E. Dyer, MD
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